

REMARKS

The Office Action mailed May 29, 2002, has been received and reviewed. Claims 19, 21-23 and 25-34 are currently pending in the application. Claims 19, 21-23 and 25-34 stand rejected. Applicant has amended claim 34, and respectfully requests reconsideration of the application as amended herein and in view of the arguments set forth below.

35 U.S.C. § 112 Claim Rejections

Claims 19, 21-23 and 25-34 stand rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Applicant respectfully traverses this rejection, as hereinafter set forth.

The Examiner specifically points to claim 19 stating that the “ the subject matter ‘... electrically conductive adhesive...’ is not described in the specification and that the “specification disclose[s] ‘...electrically insulative adhesive...’ page 6, line 20.” (Office Action, page 2).

Applicant notes that the specification teaches that a “layer of adhesive, *in some instances* an electrically insulative adhesive *as required or desired* to electrically isolate adjacent die, is applied over the back side of the lower die.” (As filed application, page 6, lines 20-22, emphasis added). Thus, the specification does not teach that an insulative adhesive is required. Furthermore, the specification explicitly teaches that “a *conductive* die attach adhesive may be employed between a flipped base die and an upper stack die so that both die may be grounded through the upper die’s wire bonds to the substrate.” (As filed specification, page 12, lines 24-26).

Applicant, therefore, submits that claims 19, 21-23 and 25-34 comply with the requirements of 35 U.S.C. § 112, first paragraph, and respectfully requests reconsideration thereof.

Claim 34 stands rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as

the invention. Applicant has amended claim 34 and respectfully requests reconsideration thereof.

35 U.S.C. § 102(b) Anticipation Rejections

Anticipation Rejection Based on JP Patent 5-13665 to Yamauchi

Claim 19 stands rejected under 35 U.S.C. § 102(b) as being anticipated by Yamauchi, JP Patent 5-13665. Applicant respectfully traverses this rejection, as hereinafter set forth.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Independent claim 19 is directed to a method of fabricating a multi-die assembly. The method includes: providing a substrate including a plurality of conductors; attaching at least one active face-down base die to said substrate in electrical communication with at least some of said plurality of conductors; securing the back side of at least one active face-up stack die to said at least one base die *with electrically conductive adhesive*; electrically connecting said at least one stack die to at least one of said conductors; and *electrically grounding said at least one base die via said electrically conductive adhesive and said at least one stack die*.

The Examiner cites Yamauchi, and particularly the English abstract, as disclosing a method of fabricating a multi-die assembly including the subject matter of “securing a back side of at least one active face up stack die 2a to the at least one base die with an adhesive 7,” and “electrically connecting at least one stack die to at least one of the conductors and electrically grounding [the] at least one base die via the electrically conductive adhesive and at least one stack die.” (Office Action, page 3).

Applicant notes that English abstract of Yamauchi (reproduced below in its entirety) teaches the following:

PURPOSE: To increase a mounting rate of TAB chips on a printed board by piling up at least two TAB chips and then by mounting these chips on the printed board.

CONSTITUTION: AT least two TAB chips 2a, 2a [sic] are joined with *an adhesive 7* with end faces having no bump 3 faced each other. The bumps 3 are

located on an upper and a lower end face of the TAB chip laminated body 2 and the TAB chip laminated bodies 2 are piled up. Next, the bumps 3 of the lower TAB chip 2a are joined with a printed board 1 with solder 4. Meanwhile, the bumps 3 of the upper TAB chip 2 are connected with one end of wire leads 6 and the other end of the wire leads is joined to a pad of the printed board 1. By this method, a mount rate on the printed board 1 can be increased and a TAB chip mounting area can be reduced substantially. (Yamauchi, English abstract, emphasis added)

Thus, while Yamauchi teaches the use of *an adhesive*, there is clearly no teaching of a *conductive* adhesive. Nor is there any teaching by Yamauchi regarding grounding the base stack die through a layer of conductive adhesive and the wire bonds of an upper stack die.

Applicant, therefore, submits that claim 19 of the presently claimed invention is clearly patentable over Yamauchi and respectfully request reconsideration and allowance thereof.

35 U.S.C. § 103(a) Obviousness Rejections

Obviousness Rejection Based on JP Patent 5-13665 to Yamauchi in View of U.S. Patent No. 5,323,060 to Fogal et al.

Claims 21-23, 25-29 and 33-34 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Yamauchi (JP Patent 5-13665) in view of Fogal et al. (U.S. Patent No. 5,323,060). Applicant respectfully traverses this rejection, as hereinafter set forth.

M.P.E.P. 706.02(j) sets forth the standard for a Section 103(a) rejection:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, **the prior art reference (or references when combined) must teach or suggest all the claim limitations.** The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). (Emphasis added).

The 35 U.S.C. § 103(a) obviousness rejections of claims 21-23, 25-29 and 33-34 are improper because the references relied upon by the Examiner fail to teach or suggest all of the limitations set forth in the presently claimed invention and because there is a lack of motivation to combine the references.

Claims 21-23, 25-29, 33 and 34 each depend from independent claim 19 either directly or through intervening claims. As set forth above, Yamauchi clearly fails to teach or suggest all of the subject matter of the presently claimed invention as set forth in independent claim 19. Particularly, Yamauchi fails to teach or suggest securing the back side of at least one active face-up stack die to said at least one base die *with electrically conductive adhesive*. Furthermore, Yamauchi fails to teach or suggest grounding the base stack die through a layer of conductive adhesive and the wire bonds of an upper stack die. Applicant further submits that Fogal fails to teach or suggest such subject matter.

Additionally, Applicant submits that there is a lack of motivation to combine the teachings of the references relied upon by the Examiner as Yamauchi teaches back-to-back arrangements of the semiconductor dies while Fogal teaches face-to-back arrangements of semiconductor die with no apparent suggestion in either of such references that the teachings of one are applicable to the other.

Applicant, therefore, submits that claims 21-23, 25-29, 33 and 34 are allowable over Yamauchi and Fogal, either considered individually or in combination, and respectfully requests reconsideration and allowance of the same.

Obviousness Rejection Based on JP Patent 5-13665 to Yamauchi in View of U.S. Patent No. 5,323,060 to Fogal et al., and Further In View of U.S. Patent No. 5,399,898 to Rostoker

Claims 30-32 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Yamauchi (JP Patent 5-13665) in view of Fogal et al. (U.S. Patent No. 5,323,060), and further in view of Rostoker (U.S. Patent No. 5,399,898). Applicant respectfully traverses this rejection, as hereinafter set forth.

Each of claims 30-32 depend from claim 19 either directly or through intervening claims. As set forth above, Yamauchi clearly fails to teach or suggest all of the subject matter of the presently claimed invention as set forth in independent claim 19. Particularly, Yamauchi fails to teach or suggest securing the back side of at least one active face-up stack die to said at least one base die *with electrically conductive adhesive*. Furthermore, Yamauchi fails to teach or suggest grounding the base stack die through a layer of conductive adhesive

and the wire bonds of an upper stack die. Applicant further submits that Rostoker fails to teach or suggest such subject matter.

Additionally, Applicant submits that there is a lack of motivation to combine the teachings of the references relied upon by the Examiner as Yamauchi teaches back-to-back arrangements of the semiconductor dies while Rostoker teaches face-to-face arrangements of semiconductor die with no apparent suggestion in either of such references that the teachings of one are applicable to the other. Furthermore, with respect to claims 31 and 32, while the Examiner points to FIG. 4A of Rostoker as teaching the subject matter of bridging two base die with a stack die, Applicant submits that one of ordinary skill in the art would lack motivation to combine such a teaching with Yamauchi. Rostoker explicitly states that such an embodiment requires increased substrate surface area (see col. 15, lines 9-11) thereby teaching away from Yamauchi which states that its disclosed arrangement is desirable because it substantially *reduces* mounting area

Applicant, therefore, submits that claims 30-32 are allowable over Yamauchi and Fogal, either considered individually or in combination, and respectfully requests reconsideration and allowance of the same.

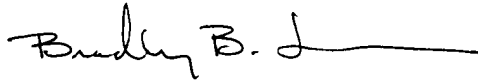
ENTRY OF AMENDMENTS

The amendment to claim 34 above should be entered by the Examiner because the amendments are supported by the as-filed specification and drawings and does not add any new matter to the application. Further, the amendment does not raise new issues or require a further search.

CONCLUSION

Claims 19, 21-23 and 25-34 are believed to be in condition for allowance, and an early notice thereof is respectfully solicited. Should the Examiner determine that additional issues remain which might be resolved by a telephone conference, he is respectfully invited to contact Applicants' undersigned attorney.

Respectfully submitted,



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Enclosure: Version With Markings to Show Changes Made

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

34. (Four Times Amended) The method of claim 33, further comprising[:
securing at least another discrete component to said substrate; and]
extending a die-to-component bond wire between [said at least one stack die and] said at least
[another] one discrete component and at least one of said plurality of substrate
conductors.